IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Russell Gaudiana	Art Unit	: 1795
Serial No.	: 10/723,554	Examiner	: Thanh Truc Trinh
Filed	: November 26, 2003	Conf. No.	: 9727
Title	: PHOTOVOLTAIC CELL WITH MESH ELECTRODE		

Commissioner for Patents
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REPLY BRIEF

Pursuant to 37 C.F.R. § 41.41, Appellant responds to the Examiner's Answer as follows.

Fundamentally, the Examiner's approach to maintaining the obviousness rejections based on the modification of Scher based on Saricifti is improper because it is based on hindsight reasoning -- going back to the proper point in time, it would not have been obvious to one skilled in the art, starting with Scher, to modify Scher in the manner stated by Examiner based on the teachings of Saricifti. Said another way, at the proper point in time, considering the teachings of Scher and Saricifti, it would not have been obvious to one skilled in the art to replace Scher's nanocrystal component material with a fullerene disclosed in Saricifti.

To the contrary, Scher emphasizes that the absorption spectrum of an active layer can be optimized in his nanocrystal component:

> one can adjust or tune the absorption spectrum of the active layer or layers by adjusting the composition of the nanostructure (e.g., nanocrystal) component or components to fit the needs of the particular application. In particular, as noted previously, the absorption spectrum of semiconductor nanocrystals can be adjusted depending upon the composition and/or size of the nanocrystals. *See* Scher, col. 28 lines 21-27.

Thus, Scher clearly teaches that the absorbing properties of his nanocrystal component are very important to his invention. Yet, Saricifti discloses that it is the polymer, not the fullerene, that acts as the light absorber in his system. *See, e.g.,* Saricifti, col. 2, line 30-col. 3, line 5, col. 5, lines 49-59, and col. 6, lines 25-35. Therefore, the important advantage of being able to tailor the absorption spectrum of the light absorbing material that Scher says is provided by his

nanocrystal component would be forfeited if the Examiner's proposed combination were made (in which Scher's device is modified by replacing his nanocrystal component with Saricifti's fullerene).

In addition, Scher explains that his nanocrystal component can provide the benefit of an elongated conductive path within a device:

> in preferred aspects, the active layers described herein employ nanostructures that provide an elongated conductive path, which path is oriented predominantly normal to the plane of the two opposing electrodes of the device. As noted above, this can be accomplished by providing elongated nanorods that are oriented such that their longitudinal axes are predominantly normal to the plane of the electrodes. By "oriented predominantly normal to the plane" is generally meant that the average longitudinal dimension of the collection of nanorods within the active layer is oriented more normal to the plane of the two electrodes than would be the case of a completely randomly oriented collection of nanorods. *See* Scher, col. 18, line 58-col. 19, line 3.

But, as is well known in the art, fullerenes have a substantially spherical molecular shape (indeed, their physical appearance is the basis for their name). As a result, the advantages that Scher associates with the ability to orient his nanostructure component would also be lost if the Examiner's proposed modifications to Scher were made.

Thus, contrary to the Examiner's allegations, the nanocrystal component disclosed by Scher is not a peripheral component of Scher's device that would have been viewed by one skilled in the art as interchangeably replaceable by a fullerene. Rather, after reading Scher, one skilled in the art would have understood that Scher viewed his nanocrystal component as the most important component in his device.

Indeed, after reading Scher, rather than keeping Scher's polymer and removing his nanocrystal component, one skilled in the art, if somehow motivated to modify Scher, would have eliminated Scher's polymer. For example, Scher says:

> In particular, the inclusion of conductive polymers in carrying out the charge separation operation is believed to result in some lost efficiency

> associated with transfer of charge from the crystal to the polymer. *See id.,* col. 17 lines 12-15.

Scher also says that:

> one can substantially, if not entirely, eliminate the need for the conducting polymer component of the active layer of any device. *See id.,* col. 16 lines 65-67.

In fact, according to Scher, the way to mitigate the low efficiency of the polymer is to precisely recognize that the:

> use of inorganic nanostructures to provide both hole and electron conducting materials in the active layer can obviate the need for a conductive polymer component in the active layer. *See id.,* col. 27 lines 9-13.

In addition, Scher comments that:

> (b)y using a core-shell nanocrystal as the active layer, one obviates the need for the conductive polymer contribution to the operation of the device, e.g., the shell (or core, depending upon composition) functions in the same manner as the polymer, e.g., as the hole carrier. *See id.*, col. 23, lines 43-48.

Furthermore, Scher describes the conductive polymer matrices as "light stable" (*see id.,* col. 17 lines 36), indicating that Scher may not have even envisioned the polymer matrices as playing a significant role in light absorption. In stark contrast, Saricifti focused on the light absorbing properties of his polymers. *See, e.g.,* Saricifti, col. 2, line 30-col. 3, line 5, col. 5, lines 49-59, and col. 6, lines 25-35.

For the reasons noted above, as well as the reasons stated in the Appeal Brief, Appellant submits that the rejections of the pending claims should be reversed.

Please apply any charges or credits to Deposit Account No. 06 1050.

Respectfully submitted,

Date: March 26, 2010

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